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Quality of leadership in multidisciplinary cancer tumor boards:

Development and evaluation of a leadership assessment instrument (ATLAS)

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Conflicts of interest:

Sevdalis is the Director of London Safety & Training Solutions Ltd, which provides team skills training and advice on a consultancy basis in hospitals and training programs in the UK and internationally. The other authors have no conflicts of interest to report.

Abstract

Background: High quality leadership and chairing skills are vital for good performance in multidisciplinary tumor boards (MTBs), but no instruments currently exist for assessing and improving these skills.

Objective: to construct and validate a robust instrument for assessment of MTB leading and chairing skills.

Design and setting: We developed an observational MTB leadership assessment instrument (ATLAS). ATLAS includes 12 domains that assess the leadership and chairing skills of the MTB chairperson. ATLAS has gone through a rigorous process of refinement and content validation prior to use to assess the MTB lead by two urological surgeons (blinded to each other) in seven real-live (n=286 cases) and 10 video-recorded (n=131 cases) MTBs.

Outcome measures and statistical analysis: ATLAS domains were analyzed via descriptive statistics. Instrument content was evaluated for validity using the Content Validation Index (CVI). Intraclass Correlation Coefficients (ICCs) were used to assess inter-observer reliability.

Results: Instrument refining resulted in ATLAS including the following twelve domains: time management, communication, encouraging contribution, ability to summarize, ensuring all patients have treatment plan, case prioritization, keeping meeting focused, facilitate discussion, conflict management, leadership, creating good working atmosphere and recruitment for clinical trials. CVI was acceptable and inter-rater agreement adequate to high for all domains. Agreement was somewhat higher in real-time MTBs compared to video ratings. Concurrent validation evidence was derived via positive and significant correlations between ATLAS and an established validated brief MTB leadership assessment scale.

Conclusion: ATLAS is an observational assessment instrument that can be reliably used for assessing leadership and chairing skills in cancer MTBs (both live and video-recorded). The ability to assess and feedback on team leader performance provides the ground for promotion of good practice and continuing professional development of tumor board leaders.

Summary: In this article, we developed a tool to scientifically assess the leadership and chairing skills in the cancer tumor boards. This tool offers an opportunity to assess leadership skills and capabilities within these boards, and take action to improve them accordingly

Introduction:

Multidisciplinary tumor boards (MTBs; or 'cancer conferences') are well established in cancer care pathways in the UK for 2 decades (1, 2) and have been embraced in many other countries (3-6) as a standard practice to deliver cancer care. Inception of MTB-driven cancer care came about to ensure that cancer patients benefit from the expertise of a range of specialists for their diagnosis and treatment, and that care is provided according to standard guidelines. Emerging evidence shows that MTBs are associated with improved treatment decision-making(7, 8), and improved survival and reduction in unwarranted survival variation among hospitals.(9, 10)

Although critical for the delivery of cancer care, there is currently no agreed way to evaluate MTBs.(5) In the UK, where they have a 20-year history, MTBs are subject to a quality assurance exercise, termed the 'cancer peer review'. This provides an annual mandatory mechanism for assessment of the MTBs against agreed standards; these incorporate the process and structural aspects of MTBs, such as team composition. Patient survival has been proposed as a quality metric, but is deemed an unsophisticated measure, in that it is far too multifactorial to be solely attributed to effective MTB working. Further, there is currently little evidence internationally regarding how to scientifically address the multiple 'human factors' that can and do affect the functionality of a MTB. These include elements such as team decision-making, quality of team interactions, and, crucially, quality of team leadership. Such 'non-technical' elements of team performance are critical for safe and effective care delivery in areas such as operating rooms, critical care and emergency medicine – yet they remain largely under-explored within the cancer setting.(11, 12)

In this paper, we focus on leadership skills required for an effective MTB. No instrument to our knowledge currently exists that assesses leadership skills within the MTB with scientific accuracy and validity. Leadership can be defined as "a process of social influence through which an individual enlists and mobilizes the aid of others in the attainment of a collective

goal.(13) In MTBs, the role of leader, who commonly has the formal role of chairing the MTB, is central to effective running of the meetings. In a national survey of more than 2000 specialist MTB members conducted in 2009 across all tumor types in the UK, 98% of the respondents agreed that good leadership is essential for productive teamworking.(14) Based on these data, the report 'The Characteristics of an Effective Multidisciplinary Team'(15) summarized the key leadership skills required of an effective MTB leader. The leader has a unique role in the decision-making process in MTBs that is different from other team-members – i.e., facilitating multidisciplinary team discussion and information sharing. Healthcare is traditionally hierarchical, hence a more autocratic leadership style tends to prevail where the leader derives their power from their position of authority(16); however evidence from social sciences points to this being detrimental to team working and productivity.(17)The available evidence shows that the most effective leadership is democratic where the leader successfully sets goals and influences team to achieve them by working with the team in a collaborative and cooperative manner thus facilitating multidisciplinary contributions to case-discussion and information sharing.(13, 17)

Grounded on the above evidence base, the aim of this study was to scientifically develop and evaluate an instrument to systematically evaluate leadership skills at MTBs.

Methods

We developed 'A Tumor Leadership Assessment inStrument' (ATLAS) using state-of-the-art psychometric science. Tool development proceeded in phases, as illustrated in Figure 1.

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Figure 1

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Phase 1: Initial instrument derivation

As per standard practice,(18) instrument content was informed by (i) evidence on the characteristics of effective MTB leadership, (ii) expert input from senior MTB specialists, including current/former team leaders, and (iii) critical review from a human factors specialist with more than 10-years-experience in evaluating leadership and team skills in surgical and cancer pathways (NS) and a senior Attending-level surgeon/team leader/former national lead for MTB development in England (JSAG). This initial process resulted in 14 key leadership elements, which were subsequently refined.

Phase 2: ATLAS content validation

Content validation (to ensure the content of the evaluation is appropriate for its purpose) was undertaken in 2 stages:

Stage 2.1: The initial ATLAS instrument was independently and blindly reviewed by 10 senior MTB specialists who regularly chair their own MTBs. As per their recommendations, instrument wording and content was refined, resulting in 12 revised leadership domains for further assessment.

Stage 2.2: The resulting instrument was submitted to a quantitative content validation procedure. An online survey of a national sample of urology MTB specialists attending the Prostate Cancer UK Summit in 2013 was carried out. Participants were asked to rate individual leadership domains on 5-point Likert scales (1=Not applicable to 5=Extremely important). Based on the survey, a quantitative Content Validity Index (CVI) was calculated for each instrument item.(19) A CVI represents the proportion of experts who rated an item 4 or 5 on the 5-point content validation scale of its importance for MTB leadership.(20) Higher CVIs indicate higher inter-expert agreement that an item is an important element and hence should be retained to evaluate the MTB leader. A CVI value of 0.78 is considered as minimum acceptable score.(21)

Phase 3: ATLAS reliability analyses

A number of MTB leaders were assessed by two surgeon evaluators, trained in observational assessment (RJ, WA) using ATLAS. The 2 assessors were kept blinded to each other's ratings throughout the assessment process to minimize the risk of bias. Leadership was evaluated in 17 MTBs where 417 patients were reviewed (7 in vivo, 286 urologic cases; 10 video-recorded, 131 cases across different tumors). The real time assessments were conducted in London NHS Hospitals and the videos used were of MTBs across different Hospitals in the United Kingdom. A score of 1-5 assessing leadership/chairing skills during the MTB was given by the evaluators against each individual criterion listed in ATLAS – such that the minimum score on the scale was 12 (representing poor chairing and leadership skills) and the maximum score was 60 (representing very effective chairing and leadership skills). Inter-rater agreement in scoring was subsequently assessed statistically.

As part of the reliability analysis of the instrument, the internal consistency among the domains of the instrument was assessed using Cronbach's alpha.

Phase 4: ATLAS construct validation

Modern psychometric theory requires that new instruments be subjected to a validation process through demonstrating their 'relationships with other variables'.(22) This form of validity ensures a systematic, hypothesis-driven quantitative approach. For ATLAS validation we tested the following hypotheses:

H1: ATLAS will correlate positively with existing scales assessing leadership elements within MTBs.

H2: ATLAS will not correlate significantly or will correlate weakly with existing scales assessing other elements of MTB working.

Positive evidence for both hypotheses needs to be provided to offer strong convergent (H1) and discriminant (H2) validation evidence. This will mean that ATLAS captures accurately leadership elements, and it is specific to those.

To carry out this validation and test the 2 hypotheses, we administered ATLAS concurrently with a pre-existing, well-validated global MTB team functioning assessment instrument that we have developed, the MTB-Metric for the Observation of Decision-making (MTB-MODe).(11) MTB-MODe scores on 5-point behaviorally anchored scales (i) the quality of information presented at the MTB meeting when a case is reviewed and (ii) the quality of individual team-member's contribution to team decision-making, including the team leader/chair. MTB-MODe is thus much broader than ATLAS. If ATLAS accurately captures leadership skills, it should show stronger correlations with the team leader/chair item of MTB-MODe and weaker (or no) correlations with the other MTB-MODe items.

Analysis

All ATLAS scores were analyzed via descriptive statistical analyses. Content Validation Indices (CVIs) for ATLAS domains were calculated from the survey responses. Intraclass Correlation Coefficients (ICCs) were used to assess inter-rater agreement.(23, 24) Cronbach's alpha was used to assess the internal consistency across the instrument domains. Alpha values of >0.70 are considered satisfactory.(25) Pearson's correlation was used to test the 2 validation hypotheses. Statistical analysis was conducted using SPSS version 20.0 (SPSS Inc., Chicago, IL). For all analyses significance was set at $p<0.05$.

Results:

Instrument domain derivation

The initial 14 domains included in ATLAS (figure 2) were refined in phase 2.1 to 12 (figure 3).

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Figures 2 and 3

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Instrument content validation and internal consistency

Overall, 144 attendees responded to the online survey to validate the content of the instrument (Surgeons n=47, Nurses n= 37, Oncologists n=34, Radiologists n=24, others n=2). 68% (n=71) of the physicians were Attendings. 70% (n=101) of the respondents reported spending ≥ 2 hours per week attending MTBs, with 16% (n=23) being the leaders of their MTB at the time of the study. Nearly half of the respondents practiced in specialist cancer centers (48%, n=70), 36% (n=52) of them in non-specialist hospitals, and the remaining 16% (n=23) practiced in both. The majority of the participants (n=82 answered this question) reported that their MTBs are led/chaired by surgeons (76%, n=62), with oncologists the second most frequent specialists in leadership role (18%, n=15).

Table 1 summarizes the results of the formal content validation, showing the CVI for each scale item. The CVI represents the proportion of experts who rated the item as a 4 or 5 on a 5-point scale – i.e., considered it critical component of leadership. All CVIs are above the cut-off of 0.78, thus suggesting good content coverage.

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Table 1

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Further, in order to assess internal consistency of ATLAS, Cronbach's alpha was calculated and showed a significant consistency at 0.80. This means that the 12 elements of the instrument tend to be scored in the same direction – which suggests good consistency in the overall instrument scoring.(25)

Inter-observer reliability in instrument usage

Inter-rater agreement (in the form of ICCs) ranged 0.68-0.91 in the in vivo assessments compared to 0.65-0.88 for the video recorded MTB assessments. Overall, agreement was higher in meetings scored in real-time compared to those scored retrospectively based on video-recordings – the ICCs between the 2 blinded assessors showed this pattern in 7 out of the 12 elements of the scale.

Correlational analyses – convergent & discriminant validation

To further validate the instrument via the testing of the two proposed hypotheses, ATLAS scores were correlated with the mean global MODe scores on team functioning, and with the MODe Chairing component (i.e., the chair's contribution to the MTB as measured by MODe). There was a significant positive correlation between ATLAS and MODe chairing scores (r=0.617, p=0.014) and a non-significant correlation between ATLAS and MODe global scores (r=-0.196, p=0.483), Table 2. These data support both our validation hypotheses, H1 and H2 and show that ATLAS capture leadership-specific skills at MTBs.

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Table 2

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Discussion:

This is the first study to our knowledge to develop and evaluate an instrument to assess leadership skills within MTBs. The process and the steps of the instrument development ensure that the ATLAS instrument is both scientific and relevant to users. Our study relied on evidence and also experts to produce the content of the instrument. The final version of the instrument showed content validity and internal consistency. The assessors statistically agreed on ratings of leadership and chairing characteristics. Reliable assessment was demonstrated for all the 12 domains of the instrument in both real-time MTB meeting assessments and video–recorded MTBs. Finally, ATLAS showed validation evidence through statistical analyses of its relationship with other relevant variables as per requirement of modern psychometric theory.

To-date, evidence looking at leadership and chaining in multidisciplinary tumor board teams is anecdotal. Several authors have discussed the attributes and characteristics of a good and effective MTB lead – including the ability to encourage full participation of all team members and good communication skills. (31, 32) In a national survey in the UK of more than 2000 MTB members, the majority of respondents listed non-technical skills such as assertiveness, good communication skills and being a team player, and a minority listed clinical or technical expertise as a quality on the qualities that make a good and effective MTB chair/lead. (14) Currently chairs or leaders of MTBs are often senior clinicians, the majority being surgeons. If, however, non-technical skills are considered to be more essential in chaining and leading such complex meetings than clinical expertise, it may not be necessary or indeed beneficial for surgeons to be leading MTBs. Innovative senior cancer nurses are leading teams and chairing MTBs in some UK cancer centers (33) and perhaps non-clinical staff or former users of the services could also be contemplated for this role if they have the requisite chairing and leadership skills. Such innovative practices may help address some of the shortcomings of MTB-based decision-making, which include the lack of focus on the psychosocial and holistic patient review and the often exclusive focus on the biomedical aspects of the disease.

(8,34) Viewing leadership of a MTB as a skill-driven task, rather than one allocated by clinical seniority, has the potential to improve the flow and widen and focus of MTBs.

The study has limitations. The survey sample was a sample of convenience consisting of attendees of the Prostate Cancer UK summit workshop. The survey developed via SurveyMonkey engine was distributed to the meeting delegates. The authors did not have access to the full delegate list; hence response rate could not be reported. This does mean there is an element of self-selection, likely due to their interest in the topic of the survey, however the number of respondents (68% consultants/attendings) and the geographical distribution of the sample offer national coverage. There was a discrepancy of the ICC (reliability) between the real-time and video-recorded MTB assessment. This perhaps can be partly explained by that the videos were not recorded for this purpose and the quality of sound in some videos was not ideal. Finally the 12 domains of the instrument represent the items that are reported in the limited literature about the desired criteria of an effective MTB leadership; however a larger scale study is needed to find out if there are other criteria that could potentially also contribute to effective chairing and leadership and thus ATLAS can be further improved.

Urological surgeons were selected to evaluate the MTB chair using the developed instrument was based on availability of those MTB members, however we expect similar results by other trained MTB members.

We consider ATLAS a potentially useful instrument to help improve the flow of MTBs and the team-decision-making that takes place within them. Currently, MTBs suffer from time pressure and variability in the quality of decision-making.(11, 34) The MTB clinical lead who is often the chairperson too, is expected to play a key role in the functioning of the meeting and in ensuring the meeting is fit for its purpose – including MTBs are run in a time-efficient manner whilst taking into account the views of all the available experts in order to formulate a

decision plan that is based on evidence. In reality, these senior clinicians (often surgeons) are commonly left unsupported in this role. ATLAS offers a valid framework to begin analyzing how best to support the leadership of MTBs. As it stands, ATLAS can offer a means to evaluate MTB running and offer near real-time feedback to team leaders. It also identifies in a valid and meaningful manner the type of skills MTB leadership involves. We propose that ATLAS be used as a map of the nontechnical skills necessary for effective clinical leadership in the cancer care setting, and applied as a self-assessment and improvement tool by MTBs. The ATLAS assessment tool is not believed to require significant training. However if ATLAs is to be used to appoint, for example, team leads in a formal process then perhaps a formal assessors calibration phase is required. Having an efficient MTB leader is vital for effective decision making in the MTB, however, the presence of all the key MTB members is the meeting is as important.

Conclusions:

We developed an instrument to scientifically capture leadership and chairing skills in the cancer MTB setting. ATLAS showed good evidence for reliability and validity when tested across different tumors and cancer teams. ATLAS offers an opportunity to assess leadership skills and capabilities within MTBs, and take action to improve them accordingly.

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Figure 1 diagram detailing the steps of ATLAS validation process.

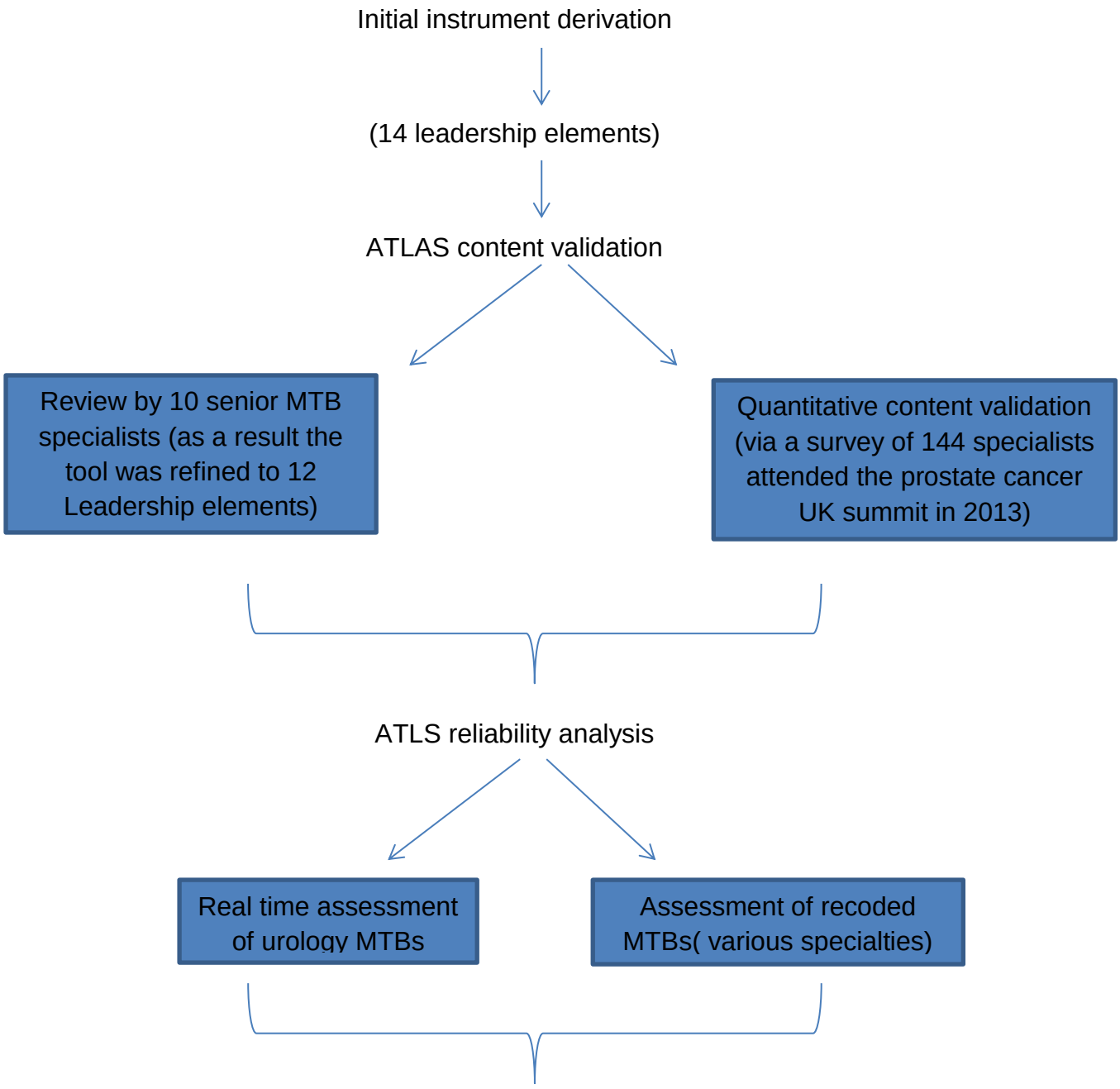

Figure 2. The initial ATLAS instrument

How would you rate the MTB Chair on the following scale?					
Chairing Criteria	Rating				
1. Ensure the meeting runs to time	1	2	3	4	5
2. Communication	1	2	3	4	5
3. Allowing/encouraging all team members to contribute (team working)	1	2	3	4	5
4. Ability to summarize	1	2	3	4	5
5. Time keeping (all patients discussed)	1	2	3	4	5
6. Each patient discussed has a clear treatment plan	1	2	3	4	5
7. Keeping meeting focused	1	2	3	4	5
8. Facilitate discussion	1	2	3	4	5
9. Conflict resolution	1	2	3	4	5
10. Leadership	1	2	3	4	5
11. Creating a good working atmosphere	1	2	3	4	5
12. Constructive and fair to the team.	1	2	3	4	5
13. Development of the MDT and its activities	1	2	3	4	5
14. Team training needs are identified	1	2	3	4	5

Figure 3: The revised ATLAS instrument

Whipps Cross University Hospital NHS — Building Futures Together

A Tumor Leadership Assessment inStrument' (ATLAS)

CPSSQ — Imperial College London

Please read the following list of specifications carefully and evaluate them accordingly. **Your Specialty and Grade:**

Number of Years of Experience:

Please use the 1-5 scale to evaluate the domains. Please provide answers for all domains below.

Chairing criteria	1	2	3	4	5
1. **Time management (all patients discussed)**	Meeting started 15 minutes late. 2 or more cases deferred due to time mis-management.		Meeting started 10 minutes late. 1 case differed due to time mis-management.		Meeting started on time. No patients deferred due to time. Chair acknowledges the time.
2. **Communication and listening**	Poor - detrimental effect to function/efficiency of MDT meeting		Neither enhanced nor detracted from function		Effective skills
3. **Allowing/encouraging all team members to contribute [team working]**	Does not invite nor give a space to members to participate.		Invites or gives a space to only few members to participate.		Invites and gives space for members to participate.
4. **Ability to summarise cases using the information that emerged during discussion.**	Not summarising/cases left unclear.		Summarised some cases. Still few cases remained unclear		All cases that were unclear/inappropriately presented were accurately summarised.
5. **Each patient discussed has a clear treatment plan**	No clear decision for many patients		Some decision plans remained unclear.		Unclear plans were clarified. Gives clear closure to unclear plans.
6. **Case prioritisation**	Cases were not prioritised.		Attempts to prioritise but inconsistent or ineffective.		Cases were prioritised as necessary.
7. **Keeping meeting focused [managing distractions]**	Distractions affected the meeting/not attempt to keep team focused.		Some effort to refocus the team, but not consistent		Refocuses the group straight away when team distracted. Keeps team to task.
8. **Facilitates discussion**	Not facilitating discussion when needed. Leads to dysfunctional/unproductive conversation.		Attempts to facilitate but not always effective.		Effective facilitation of discussion and decision making.
9. **Management of disruptive personalities and/or conflict**	Conflicts remained unsolved or and difficult personalities dominate/derail meeting.		Attempts to resolve conflicts but affected/delayed the meeting.		Effectively resolves conflicts in a timely manner. Allows effective decision despite conflict.
10. **Leadership**	Poor leadership. It was not obvious who was leading the team.		Some but inconsistent or ineffective leadership skills.		Effective leadership. Clear who chairs the team. Inspirational, enthusiasm for service
11. **Creating a good working atmosphere**	Poor atmosphere/climate during the meeting. Unproductive, antagonistic.		Atmosphere and team climate mostly OK, with occasional friction		Very good atmosphere and team climate directly facilitated by the Chair
12. **Recruitment for clinical trials**	Most eligible patients were not identified.		Some eligible patients were considered for trials.		Ensured that eligibility for relevant trials recruitment is considered for all eligible patients discussed.

Table 1. Content Validity Indices for all leadership components

Items	Number of respondents who rated the items as 5 (Extremely important) or 4 (Important) (n)	Total Responses (n)*	CVI
Team working	116	116	1.00
Communication	116	117	0.99
Time management	114	116	0.98
Ensure clear treatment plans	115	117	0.98
Keeping meeting focused	113	116	0.97
Ability to summarize	110	117	0.94
Facilitate discussion	108	115	0.94
Conflict management	103	114	0.90
Leadership	103	115	0.90
Creating good work environment	106	115	0.92
Case prioritization	95	115	0.83
Recruiting for clinical trials	89	112	0.80

Note. *N* = 144. CVI = Content Validation Indices. n = number of responses within each subgroup.

*Respondents skipped questions in the survey hence the total responses is not equal throughout different domains.

Table 2. Overall correlations between ATLAS and MODe instruments (*p<0.05)

		Mean score ATLAS (global scores)	Mean score MTB-MODe (global scores)	Mean score MTB-MODe (chairing element scores)
Mean score ATLAS (global scores)	Pearson Correlation	1	-0.196	0.617*
	N	15	15	15
Mean score MTB-MODE (global scores)	Pearson Correlation		1	0.207
	N			15